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EXAMINER	
GOLDEN, JAMES R	
ART UNIT	**PAPER NUMBER**
2187	

DATE MAILED: 06/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/698,264	KARAMANOLIS ET AL.	
	Examiner	Art Unit	
	James Golden	2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The instant application 10/698264 has a total of 31 claims pending. There are 6 independent claims and 25 dependent claims. Claims 1-31 have been rejected under statutory basis and in view of prior art.

Drawings

1. The corrections to the specification to include a reference numeral found in the drawings received on April 3, 2006 are accepted by the examiner, and the objections are withdrawn.

Specification

2. The corrections to the specification received on April 3, 2006 are accepted by the examiner, and the objections are withdrawn.

Claim Objections

3. The corrections to the claims received on April 3, 2006 are accepted by the examiner, and the objections are withdrawn.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. **Claims 1-4 and 12-22** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. A method requires a tangible result to be considered statutory, and therefore only the claims that include the step of "measuring the performance and replication cost, which are provided as outputs" (disclosure, page 27, line 24) are considered statutory. This includes all claims with the limitation "evaluating a placement of the data objects."

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1-9, 12-13, 16-18, 23-24 and 26-31** are rejected under 35 U.S.C. 102(b) as being anticipated by Karlsson et al. ("Do We Really Need Replica Placement Algorithms in Content Delivery Networks?").

8. **With respect to claim 1**, Karlsson et al. disclose a method of determining data placement for a distributed storage system comprising the steps of:

- selecting a heuristic class (page 3 [page 1 has abstract and introduction], column 2, paragraph 4 -- page 5, column 1, paragraph 1) which meets a performance requirement (page 5, column 1, paragraph 2 -- column 2,

paragraph 1) and which provides a replication cost that is within an allowable limit of a minimum replication cost (page 3, column 2, paragraph 2; cost is a constraint, and the particular cost value at which the constraint is violated is the limit); and

- instantiating a data placement heuristic selected from a range of data placement heuristics according to the heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3).

9. **With respect to claim 2**, Karlsson et al. disclose the method of claim 1 (see above paragraph 8) wherein the performance requirement comprises a bi-modal performance metric (page 5, column 1, paragraph 2 -- column 2, paragraph 1).

10. **With respect to claim 3**, Karlsson et al. disclose the method of claim 2 (see above paragraph 9) wherein the bi-modal performance requirement comprises a criterion (page 5, column 1, paragraph 2, lines 7-8) and a ratio of successful requests to total requests (page 5, column 1, paragraph 2, line 8 -- column 2, paragraph 1; a successful request is a request that has "a response latency below Y msec").

11. **With respect to claim 4**, Karlsson et al. disclose the method of claim 1 (see above paragraph 8) wherein the data placement heuristic comprises a computer-implemented technique of placing data objects onto nodes of the distributed storage system (page 5, column 2, paragraph 2, where *Coeus* is a computer-implemented tool that "produces the placement for" the algorithms).

12. **With respect to claim 5**, Karlsson et al. disclose the method of claim 4 (see above paragraph 11) further comprising the step of evaluating a placement of the data objects (Figure 1; page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; Figure 2; page 8, column 1, paragraph 3 -- column 2, paragraph 1).

13. **With respect to claim 6**, Karlsson et al. disclose the method of claim 5 (see above paragraph 12) wherein the step of evaluating the data placement heuristic provides a performance result and a cost result for the system configuration and the workload (Figure 1; page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; the graphs illustrate the performance result and the table lists the cost).

14. **With respect to claim 7**, Karlsson et al. disclose the method of claim 5 (see above paragraph 12) wherein the step of instantiating the data placement heuristic comprises simulating an instantiation of the data placement heuristic (page 4, column 2, paragraph 1, lines 1-2).

15. **With respect to claim 8**, Karlsson et al. disclose the method of claim 7 (see above paragraph 14) further comprising the steps of:

- selecting a second heuristic class for the workload and a second system configuration (page 3, column 2, paragraph 4 -- page 5, column 1, paragraph 1; a second heuristic will create a different system configuration than the first);
- instantiating a second data placement heuristic according to the second heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3); and

- evaluating a second placement of the data object made according to the second data placement heuristic (Figure 1; page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; Figure 2; page 8, column 1, paragraph 3 -- column 2, paragraph 1).

16. **With respect to claim 9**, Karlsson et al. disclose the method of claim 7 (see above paragraph 14) further comprising the steps of:

- selecting a second heuristic class for the system configuration and a second workload (Figure 2; page 8, column 1, paragraph 2 -- column 2, paragraph 1; since the storage capacities of the individual nodes vary, the load on each node varies as well);
- instantiating a second data placement heuristic according to the second heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3); and
- evaluating a second placement of the data object made according to the second data placement heuristic (Figure 1; page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; Figure 2; page 8, column 1, paragraph 3 -- column 2, paragraph 1).

17. **With respect to claim 12**, Karlsson et al. disclose the method of claim 1 (see above paragraph 8) wherein the performance requirement comprises a data access latency (page 5, column 1, paragraph 2, lines 7-8).

18. **With respect to claim 13**, Karlsson et al. disclose the method of claim 1 (see above paragraph 8) wherein the performance requirement comprises an average data access latency (page 5, column 1, paragraph 2, lines 7-8).

19. **With respect to claim 16**, Karlsson et al. disclose the method of claim 1 (see above paragraph 8) wherein the step of selecting the heuristic class determines a plurality of heuristic parameters (page 6, column 1, paragraph 1; when these heuristics are chosen, these parameters are set).

20. **With respect to claim 17**, Karlsson et al. disclose the method of claim 16 (see above paragraph 19) wherein the step of instantiating the data placement heuristic instantiates the data placement heuristic according to the heuristic parameters (page 6, column 1, paragraph 1).

21. **With respect to claim 18**, Karlsson et al. disclose the method of claim 16 (see above paragraph 20) wherein the step of instantiating the data placement heuristic sets other heuristic parameters to defaults (page 6, column 1, paragraph 1).

22. **With respect to claim 23**, Karlsson et al. disclose a method of determining data placement for a distributed storage system comprising the steps of:

- selecting a heuristic class (page 3, column 2, paragraph 4 -- page 5, column 1, paragraph 1) which meets a performance requirement (page 5, column 1, paragraph 2 -- column 2, paragraph 1) and which provides a replication cost that is within an allowable limit of a minimum replication cost (page 3, column 2, paragraph 2; cost is a constraint, and the particular cost value at which the constraint is violated is the limit); and

- instantiating a data placement heuristic selected from a range of data placement heuristics according to the heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3); and
- evaluating a placement of data objects onto nodes of the distributed storage system made according to the data placement heuristic (Figure 1; page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; Figure 2; page 8, column 1, paragraph 3 -- column 2, paragraph 1).

23. **With respect to claim 24**, Karlsson et al. disclose the method of claim 23 (see above paragraph 22) wherein the step of instantiating the data placement heuristic comprises simulating an instantiation of the data placement heuristic (page 4, column 2, paragraph 1, lines 1-2).

24. **With respect to claim 26**, Karlsson et al. disclose the method of claim 23 (see above paragraph 22) wherein

- selecting a heuristic class (page 3, column 2, paragraph 4 -- page 5, column 1, paragraph 1) which meets a performance requirement (page 5, column 1, paragraph 2 -- column 2, paragraph 1) and which provides a replication cost that is within an allowable limit of a minimum replication cost (page 3, column 2, paragraph 2; cost is a constraint, and the particular cost value at which the constraint is violated is the limit); and
- instantiating a data placement heuristic selected from a range of data placement heuristics according to the heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3); and

- evaluating a placement of data objects onto nodes of the distributed storage system made according to the data placement heuristic (Figure 1; page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; Figure 2; page 8, column 1, paragraph 3 -- column 2, paragraph 1); and
- iteratively performing the steps of selecting the heuristic class, instantiating the data placement heuristic, and evaluating the placement of the data objects (Figures 1 and 2 show results for several different heuristics, indicating an iterative selection, instantiation and evaluation).

25. **With respect to claim 27**, Karlsson et al. disclose the method of claim 26 (see above paragraph 24) wherein second and subsequent performance of the steps of selecting the heuristic class, instantiating the data placement heuristic, and evaluating the placement of the data objects seeks to improve the data placement heuristic (page 1, column 2, paragraph 2; the quantitative evaluation of all the data placement heuristics is used to determine whether any heuristics are better than caching, and this entails searching for the best heuristic).

26. **With respect to claim 28** Karlsson et al. disclose the method of claim 26 (see above paragraph 24) wherein second and subsequent performance of the steps of selecting the heuristic class, instantiating the data placement heuristic, and evaluating the placement of the data objects seeks to modify the data placement heuristic to account for a changing workload (Figure 2; page 8, column 1, paragraph 2 -- column 2, paragraph 1; since the storage capacities of the individual nodes vary, the load on each node varies as well).

27. **With respect to claim 29**, Karlsson et al. disclose a computer readable memory comprising computer code for implementing a method of determining data placement for a distributed storage system, the method of determining the data placement comprising the steps of:

- selecting a heuristic class (page 3, column 2, paragraph 4 -- page 5, column 1, paragraph 1) which meets a performance requirement (page 5, column 1, paragraph 2 -- column 2, paragraph 1) and which provides a replication cost that is within an allowable limit of a minimum replication cost (page 3, column 2, paragraph 2; cost is a constraint, and the particular cost value at which the constraint is violated is the limit); and
- instantiating a data placement heuristic selected from a range of data placement heuristics according to the heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3).

28. **With respect to claim 30**, Karlsson et al. disclose a computer readable memory comprising computer code for implementing a method of determining data placement for a distributed storage system, the method of determining the data placement comprising the steps of:

- selecting a heuristic class (page 3, column 2, paragraph 4 -- page 5, column 1, paragraph 1) which meets a performance requirement (page 5, column 1, paragraph 2 -- column 2, paragraph 1) and which provides a replication cost that is within an allowable limit of a minimum replication cost (page 3, column 2, paragraph 2; cost is a constraint, and the particular cost value at which the constraint is violated is the limit); and

- instantiating a data placement heuristic selected from a range of data placement heuristics according to the heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3); and
- evaluating a placement of data objects onto nodes of the distributed storage system made according to the data placement heuristic (Figure 1; page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; Figure 2; page 8, column 1, paragraph 3 -- column 2, paragraph 1).

29. **With respect to claim 31**, Karlsson et al. disclose a computer readable memory comprising computer code for implementing a method of determining data placement for a distributed storage system, the method of determining the data placement comprising the steps of:

- selecting a heuristic class (page 3 [page 1 has abstract and introduction], column 2, paragraph 4 -- page 5, column 1, paragraph 1) which meets a performance requirement (page 5, column 1, paragraph 2 -- column 2, paragraph 1) and which provides a replication cost that is within an allowable limit of a minimum replication cost (page 3, column 2, paragraph 2; cost is a constraint, and the particular cost value at which the constraint is violated is the limit); and
- instantiating a data placement heuristic selected from a range of data placement heuristics according to the heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3); and
- evaluating a placement of data objects onto nodes of the distributed storage system made according to the data placement heuristic (Figure 1;

page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; Figure 2; page 8, column 1, paragraph 3 -- column 2, paragraph 1); and

- iteratively performing the steps of selecting the heuristic class, instantiating the data placement heuristic, and evaluating the placement of the data objects (Figures 1 and 2 show results for several different heuristics, indicating an iterative selection, instantiation and evaluation).

30. **Claims 1, 14-15, 19 and 20-22** are rejected under 35 U.S.C. 102(b) as being anticipated by Karlsson et al. ("A Framework for Evaluating Replica Placement Algorithms").

31. **With respect to claim 1**, Karlsson et al. disclose

- selecting a heuristic class (page 2, column 1, paragraph 2, lines 6-11) which meets a performance requirement (page 9, column 2, paragraph 1, lines 2-3) and which provides a replication cost that is within an allowable limit of a minimum replication cost (page 5, column 1, paragraph 5, "Fixed Threshold"); and
- instantiating a data placement heuristic selected from a range of data placement heuristics according to the heuristic class (page 2, column 1, paragraph 2, lines 8-11).

32. **With respect to claim 14**, Karlsson et al. disclose the method of claim 1 (see above paragraph 31) wherein the performance requirement comprises a data access bandwidth (page 3, column 1, paragraph 5).

33. **With respect to claim 15**, Karlsson et al. disclose the method of claim 1 (see above paragraph 31) wherein the performance requirement comprises a

data update time (page 4, column 1, paragraph 2, line 5 -- column 2, paragraph 1, line 2).

34. **With respect to claim 19**, Karlsson et al. disclose the method of claim 1 (see above paragraph 8) wherein the replication cost comprises data storage cost (page 2, column 2, paragraph 7).

35. **With respect to claim 20**, Karlsson et al. disclose the method of claim 1 (see above paragraph 31) wherein the replication cost comprises a replica creation cost (page 3, column 1, paragraph 5, "Link Capacity;" a bandwidth constraint factored into the cost "for objects being replicated").

36. **With respect to claim 21**, Karlsson et al. disclose the method of claim 20 (see above paragraph 35) wherein the replica creation cost comprises a network bandwidth cost for transferring replicas and replica changes (page 3, column 1, paragraph 5, "Link Capacity;" a bandwidth constraint factored into the cost "for objects being replicated").

37. **With respect to claim 22**, Karlsson et al. disclose the method of claim 20 (see above paragraph 35) wherein the replica creation cost comprises a system load cost for running the data placement heuristic (page 3, column 1, paragraph 3, "Load Capacity;" this constraint accounts for "the rate of requests a node can serve", which would include requests resulting from running the data placement heuristic).

Claim Rejections - 35 USC § 103

38. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

39. **Claims 10-11 and 25** are rejected under 35 U.S.C. 103(a) as being anticipated over Karlsson et al. ("Do We Really Need Replica Placement Algorithms in Content Delivery Networks?") in view of Lumelsky et al. (US 6,466,980).

40. **With respect to claim 10**, Karlsson et al. disclose the method of claim 5 (see above paragraph 12).

Karlsson et al. do not disclose the limitation wherein the step of instantiating the data placement heuristic comprises instantiating the data placement heuristic on an actual distributed storage system operating with an actual workload.

However, Lumelsky et al. disclose the limitation wherein the step of instantiating the data placement heuristic comprises instantiating the data placement heuristic on an actual distributed storage system operating with an actual workload (Figs. 4 and 5; column 8, lines 12-35; column 11, lines 27-31; the actual workload is inherent in operating the heuristic in an actual system).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to implement one of the data placement heuristics described in Karlsson et al. on an actual system as described by Lumelsky et al. The motivation for doing so would have been to provide "an adaptive resource management function for distributed resources that could, on-demand, shape system capacity to the needs of the environment" (column 6, lines 4-9).

Therefore, it would have been obvious to combine Lumelsky et al. with Karlsson et al. for the benefit of an actual system that utilizes a data placement heuristic to obtain the invention as specified in claim 10.

41. **With respect to claim 11**, Karlsson et al. disclose the method of claim 10 (see above paragraph 40) further comprising the steps of:

- selecting a second heuristic class for the system configuration and the workload (Figure 2; page 8, column 1, paragraph 2 -- column 2, paragraph 1; since the storage capacities of the individual nodes vary, the load on each node varies as well);
- instantiating a second data placement heuristic according to the second heuristic class (page 5, column 2, paragraph 2 -- page 6, column 1, paragraph 3); and
- evaluating a second placement of the data object made according to the second data placement heuristic (Figure 1; page 6, column 2, paragraph 3 -- page 7, column 1, paragraph 1; Figure 2; page 8, column 1, paragraph 3 -- column 2, paragraph 1).

Karlsson et al. do not disclose the limitation wherein the second heuristic is selected for an actual workload.

However, Lumelsky et al. disclose the limitation wherein an actual distributed storage system operating with an actual workload uses the heuristic (Figs. 4 and 5; column 8, lines 12-35; column 11, lines 27-31; the actual workload is inherent in operating the heuristic in an actual system).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to implement one of the data placement heuristics described in Karlsson et al. on an actual system as described by Lumelsky et al. The motivation for doing so would have been to provide "an adaptive resource management function for distributed resources that could, on-demand, shape system capacity to the needs of the environment" (column 6, lines 4-9).

Therefore, it would have been obvious to combine Lumelsky et al. with Karlsson et al. for the benefit of an actual system that utilizes a data placement heuristic to obtain the invention as specified in claim 11.

42. **With respect to claim 25**, Karlsson et al. disclose the method of claim 23 (see above paragraph 7).

Karlsson et al. do not disclose the limitation wherein the step of instantiating the data placement heuristic comprises instantiating the data placement heuristic on an actual distributed storage system operating with an actual workload.

However, Lumelsky et al. disclose the limitation wherein the step of instantiating the data placement heuristic comprises instantiating the data

placement heuristic on an actual distributed storage system operating with an actual workload (Figs. 4 and 5; column 8, lines 12-35; column 11, lines 27-31; the actual workload is inherent in operating the heuristic in an actual system).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to implement one of the data placement heuristics described in Karlsson et al. on an actual system as described by Lumelsky et al. The motivation for doing so would have been to provide "an adaptive resource management function for distributed resources that could, on-demand, shape system capacity to the needs of the environment" (column 6, lines 4-9).

Therefore, it would have been obvious to combine Lumelsky et al. with Karlsson et al. for the benefit of an actual system that utilizes a data placement heuristic to obtain the invention as specified in claim 10.

Response to Arguments

43. **With respect to applicant's arguments regarding the rejection of claims 1-4 and 12-22 under *35 USC § 101***, while the explanation of "instantiating a data placement heuristic" (claim 1) found in the specification may include the placement of data, that limitation is not found in the claim. Therefore, a tangible result is not produced, and the rejections of claims 1-4 and 12-22 under *35 USC § 101* stand as issued.

44. **With respect to applicant's arguments regarding the rejection of claims 1-31 under *35 USC § 112***, applicant's arguments are considered persuasive and the rejections of claims 1-31 under *35 USC § 112* are withdrawn.

45. **With respect to applicant's arguments regarding the rejection of claim 1 under *35 USC § 102***, Karlsson I ("Do We Really Need...") does teach heuristic classes and the selection of a heuristic class. The heuristic classes are displayed in the second column of Table 2, "approximation method". Further evidence that these different approximation methods are classes of heuristics is found in Table II of Karlsson II ("A Framework..."), where specific heuristics are classified as "Ranking", "Improvement" or "Threshold" heuristics. Selection of heuristic classes is detailed in page 2, column 2, paragraph 4 -- page 3, column 1, paragraph 1. A number of specific heuristics are tested, and they are members of heuristic classes; for example, *Ranking Local, Popularity* and *Ranking Dist* are members of the Ranking class, *Swap* is a member of the Improvement class, and *Langrangian* is a member of the Langrangian class. While the heuristics of the Ranking class are instantiated, that class is selected, and the same is true of the other classes.

These arguments apply to the limitation "which meets a performance requirement" as well.

Regarding the limitation "a replication cost that is within an allowable limit of a minimum replication cost", the cited text of Karlsson I teaches that the replica placement algorithm "then randomly picks one object and puts it on another node, making sure that the constraints are still satisfied. If this placement has a better cost it keeps it, otherwise it reverts back to the previous one." The cost for a replication is calculated, and if it is less than the previous cost it is kept. Therefore the previous cost is the minimum cost, and since the above arguments

regarding the teaching of heuristic classes and selection of heuristic classes apply as well, this limitation is taught by Karlsson I.

Karlsson I also teaches the limitation "instantiating a data placement heuristic selected from a range of data placements according to the heuristic class", because he teaches heuristic classes as argued above.

46. **Applicant's arguments regarding the rejection of claims 2-8, 12-13, 16-18, 23-24 and 26-31 under *35 USC § 102*** are moot in view of the above arguments upholding the rejection to claim 1 as anticipated by Karlsson I.

47. **With respect to applicant's arguments regarding the rejection of claim 1 under *35 USC § 102***, Karlsson II ("A Framework...") does teach heuristic classes and the selection of a heuristic class. The heuristic classes are displayed in Table II of Karlsson II, where specific heuristics are classified as "Ranking", "Improvement" or "Threshold" heuristics. Further evidence that these different approximation methods are classes of heuristics is found in the second column of Table 2, "approximation method" of Karlsson I. Selection of heuristic classes is detailed in page 2, column 1, paragraph 2, lines 6-11. A number of specific heuristics, or RPAs, are tested, and they are members of heuristic classes; for example, *Ranking Local, Popularity* and *Ranking Dist* are members of the Ranking class, *2-distance* is a member of the Improvement class, and *Langrangian* is a member of the Langrangian class. While the heuristics of the Ranking class are instantiated, that class is selected, and the same is true of the other classes.

Regarding the limitation "which meets a performance requirement", the performance requirement is "the ratio of access under the threshold" (Karlsson II). The above arguments regarding heuristic classes apply to this limitation as well.

Regarding the limitation "which provides a replication cost that is within an allowable limit of a minimum replication cost", the cited text of Karlsson I teaches that "an object is placed at a specific node, if the cost function is above or below a specified threshold." The cost for a replication is calculated, and if it meets a threshold requirement, it is kept. The above arguments regarding the teaching of heuristic classes and selection of heuristic classes apply as well, this limitation is taught by Karlsson II.

Karlsson II also teaches the limitation "instantiating a data placement heuristic selected from a range of data placements according to the heuristic class", because he teaches heuristic classes as argued above.

48. **Applicant's arguments regarding the rejection of claims 14-15, 19 and 20-22 under *35 USC § 102*** are moot in view of the above arguments upholding the rejection to claim 1 as anticipated by Karlsson II.

49. **Applicant's arguments regarding the rejection of claims 10-11 and 25 under *35 USC § 103*** are moot in view of the above arguments upholding the rejection to claim 1 as anticipated by Karlsson I.

Conclusion

50. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

51. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Alvarez et al. (US 2002/0177989) teach evaluating the performance of a distributed system.
- Ye (US 6,374,227) teaches optimizing the distribution of files in a distributed system.

52. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Golden whose telephone number is 571-272-5628. The examiner can normally be reached on Monday-Friday, 8:30 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571-272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James R. Golden
Patent Examiner
Art Unit 2187

June 22, 2006

Brian R. Reugh
Primary Examiner